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ABSTRACT

The knowledge and skills needed by college entrants are described in depth. Attention is directed to six basic academic competencies that are general skills necessary for effective work in all subjects, along with six basic academic subjects on which college-level study is based. The following basic academic competencies are outlined: reading, writing, speaking and listening, mathematics, reasoning, and studying. Additionally, for each basic academic subject, an explanation is offered of why preparation is important for college entrants. Outlines of what college entrants need to know and be able to do in each subject area are presented also. The subject areas are as follows: English, the arts, mathematics, science, social studies, and foreign language. The newly emerging need for computer competency is also discussed, and another possible competency area (observing) is briefly addressed. The approach to using the combined judgments of hundreds of educators to describe the knowledge and skills areas is sketched, and the College Board's efforts to strengthen the academic preparation of students for college through the Educational EQuality Project is noted. The need for action by schools and others to achieve these learning outcomes is briefly addressed. Appendices include lists of advisory committee members. (SW)

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# Academic Preparation For College

## What Students Need to Know and Be Able to Do

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The College Board, New York, 1983

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For additional copies of this booklet or for more information about the Educational EQuality Project, write to the Office of Academic Affairs, The College Board, 888 Seventh Avenue, New York, New York 10106. The telephone number is (212) 582-6210.

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It would be unfortunate not to point out the essential point of this whole undertaking. . . . The important thing is the close and intimate association of the secondary schools and colleges in dealing with a common interest and a common task. What this Board has done is to break down the isolation of the schools and the isolation of the colleges and to bring them together into close and constant contact for the solution of their common problems. . . . The common understanding, the common sympathy, and the common knowledge that have been developed are a source of strength, the full power of which has yet to be tested in ways that we cannot now foresee.

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From remarks by Nicholas Murray Butler on the twenty-fifth anniversary of the College Board, November 6, 1925.

The Educational EQuality Project is a 10-year effort of the College Board to strengthen the academic quality of secondary education and to ensure equality of opportunity for postsecondary education for all students. Begun in 1980, the project is under the direction of the Board's Office of Academic Affairs.

The College Board wishes to thank the hundreds of school and college educators who contributed to the deliberations that produced *Academic Preparation for College*. Although none of them is, of course, individually responsible for any part of the contents of this booklet, the Educational EQuality Project owes much to their committed and painstaking work.

# Contents


I. **Identifying the Outcomes** ..... *1*

II. **The Basic Academic Competencies** ..... *7*
Reading
Writing
Speaking and Listening
Mathematics
Reasoning
Studying

III. **Computer Competency: An Emerging Need** ..... *11*

IV. **The Basic Academic Subjects** ..... *13*
English
The Arts
Mathematics
Science
Social Studies
Foreign Language

V. **Achieving the Outcomes** ..... *31*

**Appendixes**

A. **Observing: A Competency to Consider** ..... *35*

B. **Members of the Council on Academic Affairs, 1980-33** ..... *37*

C. **Members of the Advisory Panel on Minority Concerns, 1980-82** ..... *39*

D. **Members of the Academic Advisory Committees, 1981-83** .. *41*
English Advisory Committee
Ad Hoc Arts Advisory Committee
Mathematical Sciences Advisory Committee

Sciences Advisory Committee
History Advisory Committee
Foreign Language Advisory Committee

E. **Members of the Ad Hoc Panel on Computer Competency, 1983** ..... *44*

F. **List of Dialogues** ..... *45*
Urban Dialogues on the Basic Academic Competencies
Dialogues on the Basic Academic Subjects

# I. Identifying the Outcomes

All students entering college deserve a fair chance to succeed in higher education. To do so, they must be adequately prepared for college-level study.

One of our nation's great educational triumphs is that since the middle of this century admission to college, once the privilege of a few, has been brought within the reach of a majority of high school graduates. Yet inadequate preparation in effect deprives students of a fair chance to take advantage of this opportunity.

In recent years, many college entrants have not had the knowledge and skills needed for higher education. Many have been severely limited in their choice of college or have been unable to pursue their choice of program. Many inadequately prepared college students have dropped out in frustration or have failed their courses. Many who did graduate had such poor records that they could not go on to graduate or professional study.

These stunted hopes are a major reason for growing national concern about the quality of education in our schools. Adding to that concern is the fact that many other students do not complete their high school education and cannot even aspire to college. Taken together, these are powerful arguments for mounting a major national effort to improve the quality of education in our secondary schools. *Academic Preparation for College* offers a basis for a central aspect of this effort: improving academic or college preparatory education. It begins with the premise that, in order to improve preparation for college, the necessary outcomes of high school study must be identified: the knowledge and skills needed to obtain the full benefits of higher education.

*Academic Preparation for College* outlines what college entrants need to know and be able to do. It summarizes the combined judgments of hundreds of educators in every part of the country. It is meant for students and their parents; for teachers, counselors, and education administrators; for school boards and other government officials responsible for the overall policy and finances of our

schools. It is meant also for college and university faculties and administrators. *Academic Preparation for College* is meant for everyone who cares about how well students are prepared for college. It is the product of the work of hundreds of individuals and organizations who share this concern.

## Why Preparation Should Be Improved

Improving the preparation of students for college is necessary to fulfill our national promise of equal access to higher education. Only when students are adequately prepared can they develop their full potential by taking advantage of all resources of a college. Doing so will be as good for the nation as it will be for the individual students. Since its earliest days, the United States has been dedicated to the principle that each generation deserves a fair start. Acting on this principle has served not only justice but our national well-being. The millions of students who were able to take advantage of the opportunity for a higher education in the past contributed greatly to our prosperity and social progress. In the years ahead our economy will need an increasing number of well-educated people. Our social and political problems will require thoughtful, informed consideration. We will all be well served if educational excellence can be made possible, not just for the few, but for all students.

## What Academic Preparation Is

*Academic Preparation for College* presents a comprehensive description of the knowledge and skills needed by all college entrants. It describes what they need to learn in six Basic Academic Subjects that provide the specific knowledge and skills on which college-level study is based. It describes what they need to learn in six Basic Academic Competencies that are general skills necessary for effective work in all subjects. And it presents an additional statement on the newly emerging need for computer competency.

Learning the Basic Academic Subjects depends on the Basic Academic Competencies. At the same time, learning the Basic Academic Subjects further develops those competencies. Adequate

preparation for college involves a coherent, cumulative pattern of learning.

*Academic Preparation for College* focuses on what students learn. Students are not born with the Basic Academic Competencies. They develop these competencies as a result of education and practice. Likewise, the Basic Academic Subjects are described as the outcomes of student learning. They are not descriptions of high school curricula—of how this learning should be provided.

What students need to learn in high school is approached from the perspective of what is necessary for effective learning in college. *Academic Preparation for College* does not attempt to describe the knowledge and skills essential for those who, for whatever reason, do not choose to prepare for college. Discussions with leaders of business and industry confirm, however, that much of the learning described here also can be valuable to students going directly into the world of work. Moreover, although this learning is needed for college, it can engage and reward students in itself, over and above any other goal.

In addition to what students learn, personal characteristics such as drive, motivation, interest, intelligence, experience, and adaptability are important to getting the most out of college. Social and coping skills also can be important. This booklet, however, does not attempt to discuss everything that contributes to effective work in higher education. Its topic is limited to *academic* preparation for college.

The learning outcomes described here are rigorous as well as comprehensive. Not every participant in framing these descriptions insists that every detail of the learning outcomes is essential. They are in general, however, what the high school and college teachers who worked out these descriptions believe all college entrants need to take full advantage of higher education.

All colleges probably would prefer their entering students to have this pattern of preparation. Not every college will insist that all entering students have all of this learning—though most will expect them to acquire it before undertaking further study or in the course of their college career. Some colleges will expect more at the outset.

There are high schools that already provide some students with the knowledge and skills outlined here. The goal, however, is to provide quality preparation for as many college entrants as possible.

No attempt has been made to define the level of difficulty or the degree of sophistication that any one school or college should expect of its students. Obviously, different schools and colleges are likely to establish their own definitions in this regard.

In short, *Academic Preparation for College* is an agenda for high schools to pursue, each in the context of its own resources and mission, and in collaboration with the community it serves and the colleges its students seek to enter. Just as the learning outcomes develop along a continuum, so the more precise definition of the knowledge and skills needed by college students will evolve over time and be translated into terms suitable to each case by those most directly engaged.

## Combining Judgments

To identify the academic preparation needed for college in the coming years, the College Board turned to teachers themselves. It sought the best judgments of hundreds of educators at high schools and colleges throughout the nation. In doing so, the Board was playing a familiar role. It is made up of more than 2,500 institutions of higher and secondary education. Since 1900 its member institutions have been working together to help students make the transition from high school to college.

In 1980 the College Board made an explicit commitment to working throughout the following decade to strengthen the academic preparation of all students for college. The Educational EQuality Project is the means by which the Board is carrying out this commitment. Both the "E" and the "Q" are capitalized in the name of the project to indicate its intertwined emphases on quality and equality, on strengthening the academic preparation of *all* potential college entrants.

The initial guidance and advice that led to the Educational EQuality Project came from a group of distinguished educators and friends of education who met in September of 1980. Then more than 200 high school and college teachers serving on the Board's many committees and on its Council on Academic Affairs responded to

questionnaires and participated in meetings devoted to rethinking the subject-matter preparation that would best equip students for the most selective colleges. At the same time, the Board's Advisory Panel on Minority Concerns focused attention on the broad academic competencies needed by students entering all colleges. Seven "urban dialogues" involving schools and colleges that serve large numbers of inner-city students worked out descriptions of these skills.

These strands came together in St. Louis, Missouri, in May of 1981. A broadly representative symposium of educators met to consider both the competencies and subject-matter descriptions. The Symposium worked out the Basic Academic Competencies, which were subsequently published and which have received wide attention from educators and policy makers. They already have exercised substantial influence on curricular activities and on state and local education policy. Their relevance to employment has been established in dialogues with representatives of business and industry.

The most significant result of the St. Louis symposium was agreement that both the competencies and the subject areas should be used to define the preparation needed by entrants of *all* four-year and two-year institutions of postsecondary education. The Board's Academic Advisory Committees and its Council on Academic Affairs subsequently revised the subject-matter descriptions. In the spring of 1982 they were submitted for comment to professional associations in the various fields and to 24 dialogues of college and high school teachers held in various parts of the country. They were also discussed by parents and students. All this commentary was drawn together in a summary draft of the Basic Academic Subjects.

The College Board's Council on Academic Affairs reviewed and approved the Basic Academic Subjects in February of 1983. The Council also encouraged the Board to continue explorations and consultations concerning an emerging need for competency in the use of computers. The Board conducted widespread consultations, and in March of 1983 an ad hoc advisory panel reviewed and revised a statement on "Computer Competency: An Emerging Need." *Academic Preparation for College* thus sums up the findings of a vast, and perhaps unique, process of consultation and consensus building.

## How to Use *Academic Preparation for College*

High school students can use this booklet to help plan their education—to identify the academic courses they need and to find encouragement in choosing them and working diligently in them.

Parents can use this booklet to help identify the studies that best prepare students for college and thus to set family expectations about high school work.

Secondary schools can use this booklet to focus their curricular and instructional planning. Teachers and guidance counselors also can use it to help students and their parents see the importance of a thorough academic preparation for college.

Colleges and universities can use this booklet to help communicate to high school students—and their schools—what preparation is really necessary to take full advantage of higher education. Existing relationships among individual schools and colleges can be enhanced and new ones developed. Collaboration on translating these descriptions into specific terms will provide better focus for education in the high schools. It will also help colleges understand where they can begin educating their own students.

Finally, policy makers—school boards, legislators, and other public authorities and agencies concerned with education—can use this document as a basis for planning and setting priorities as they assess the adequacy of curricular and instructional programs they oversee and seek to improve them.

## The Challenge

The learning outcomes identified here present a challenge. If college entrants do not have the kind of preparation outlined in the following chapters, they enter higher education at a disadvantage, with an academic handicap progressively more difficult to overcome. This reality will not disappear if it is ignored or denied. Nor will it be overcome by blaming high schools, colleges, or students themselves. When concerned parties identify what all college entrants do need to know and be able to do, they can begin to take constructive and decisive steps to help students achieve these outcomes.

# II. The Basic Academic Competencies

The Basic Academic Competencies are the broad intellectual skills essential to effective work in all fields of college study. They provide a link across the disciplines of knowledge although they are not specific to any particular discipline.

The Basic Academic Competencies are reading, writing, speaking and listening, mathematics, reasoning, and studying. These competencies are interrelated to and interdependent with the Basic Academic Subjects. Without such competencies, knowledge of history, science, language, and all other subjects is unattainable.

The Basic Academic Competencies are developed abilities, the outcomes of learning and intellectual discourse. There are different levels of competency; they can be defined in measurable terms.

Although the Basic Academic Competencies are not always identified explicitly, spelling them out provides a way to tell students what is expected of them. Knowledge of what is expected is crucial to effective learning.

In order to do effective work in college, it is essential that all students have the following academic competencies.

## Reading

- The ability to identify and comprehend the main and subordinate ideas in a written work and to summarize the ideas in one's own words.
- The ability to recognize different purposes and methods of writing, to identify a writer's point of view and tone, and to interpret a writer's meaning inferentially as well as literally.
- The ability to separate one's personal opinions and assumptions from a writer's.
- The ability to vary one's reading speed and method (survey, skim, review, question, and master) according to the type of material and one's purpose for reading.

- The ability to use the features of books and other reference materials, such as table of contents, preface, introduction, titles and subtitles, index, glossary, appendix, bibliography.
- The ability to define unfamiliar words by decoding, using contextual clues, or by using a dictionary.

## Writing

- The ability to conceive ideas about a topic for the purpose of writing.
- The ability to organize, select, and relate ideas and to outline and develop them in coherent paragraphs.
- The ability to write Standard English sentences with correct:
  - sentence structure;
  - verb forms;
  - punctuation, capitalization, possessives, plural forms, and other matters of mechanics;
  - word choice and spelling.
- The ability to vary one's writing style, including vocabulary and sentence structure, for different readers and purposes.
- The ability to improve one's own writing by restructuring, correcting errors, and rewriting.
- The ability to gather information from primary and secondary sources; to write a report using this research; to quote, paraphrase, and summarize accurately; and to cite sources properly.

## Speaking and Listening

- The ability to engage critically and constructively in the exchange of ideas, particularly during class discussions and conferences with instructors.
- The ability to answer and ask questions coherently and concisely, and to follow spoken instructions.
- The ability to identify and comprehend the main and subordinate ideas in lectures and discussions, and to report accurately what others have said.
- The ability to conceive and develop ideas about a topic for the

purpose of speaking to a group; to choose and organize related ideas; to present them clearly in Standard English; and to evaluate similar presentations by others.
- The ability to vary one's use of spoken language to suit different situations.

## Mathematics

- The ability to perform, with reasonable accuracy, the computations of addition, subtraction, multiplication, and division using natural numbers, fractions, decimals, and integers.
- The ability to make and use measurements in both traditional and metric units.
- The ability to use effectively the mathematics of:
  - integers, fractions, and decimals;
  - ratios, proportions, and percentages;
  - roots and powers;
  - algebra
  - geometry.
- The ability to make estimates and approximations, and to judge the reasonableness of a result.
- The ability to formulate and solve a problem in mathematical terms.
- The ability to select and use appropriate approaches and tools in solving problems (mental computation, trial and error, paper-and-pencil techniques, calculator, and computer).
- The ability to use elementary concepts of probability and statistics.

## Reasoning

- The ability to identify and formulate problems, as well as the ability to propose and evaluate ways to solve them.
- The ability to recognize and use inductive and deductive reasoning, and to recognize fallacies in reasoning.
- The ability to draw reasonable conclusions from information

found in various sources, whether written, spoken, or displayed in tables and graphs, and to defend one's conclusions rationally.
- The ability to comprehend, develop, and use concepts and generalizations.
- The ability to distinguish between fact and opinion.

## Studying

This set of abilities is different in kind from those that precede it. They are set forth here because they constitute the key abilities in learning how to learn. Successful study skills are necessary for acquiring the other five competencies as well as for achieving the desired outcomes in the Basic Academic Subjects. Students are unlikely to be efficient in any part of their work without these study skills.

- The ability to set study goals and priorities consistent with stated course objectives and one's own progress, to establish surroundings and habits conducive to learning independently or with others, and to follow a schedule that accounts for both short- and long-term projects.
- The ability to locate and use resources external to the classroom (for example, libraries, computers, interviews, and direct observation), and to incorporate knowledge from such sources into the learning process.
- The ability to develop and use general and specialized vocabularies, and to use them for reading, writing, speaking, listening, computing, and studying.
- The ability to understand and to follow customary instructions for academic work in order to recall, comprehend, analyze, summarize, and report the main ideas from reading, lectures, and other academic experiences; and to synthesize knowledge and apply it to new situations.
- The ability to prepare for various types of examinations and to devise strategies for pacing, attempting or omitting questions, thinking, writing, and editing according to the type of examination; to satisfy other assessments of learning in meeting course objectives such as laboratory performance, class participation, simulation, and students' evaluations.
- The ability to accept constructive criticism and learn from it.

# III. Computer Competency: An Emerging Need

A revolution in communications and information technology is making the computer a basic tool for acquiring knowledge, organizing systems, and solving problems. As such, it is having a profound influence on learning and on the world of work.

In the immediate future most workers either will work directly with computers or have their work influenced by computers in some significant way. An influence as pervasive as this requires, among other things, an informed citizenry that not only understands what computers can and cannot do but also is aware of the problems and issues involved in their use.

In schools and colleges the computer is being used increasingly by students and their teachers as an instrument to receive, organize, store, analyze, and interpret information, as well as a medium for the communication of that information. Competency in its use is emerging as a basic skill complementary to other competencies, such as reading, writing, mathematics, and reasoning. The computer also provides access to bodies of knowledge in each of the academic disciplines.

Knowledge of the computer is basic to an understanding of the full range of procedures that may be applied to organizing information and solving problems in fields as diverse as mathematics, science, the social sciences, business, industry, language, and the arts. Applications of the computer to the study of writing, literature, art, music, and dance have highlighted its potential as a creative tool in these and other fields.

For these reasons students entering college will profit from the following preparation.

- A basic knowledge of how computers work and of common computer terminology.
- Some ability to use the computer and appropriate software for:
  - self-instruction;

  - collection and retrieval of information;
  - word processing (including the development of keyboard, composition, and editing skills);
  - modeling, simulations, and decision making;
  - problem solving—both through the use of existing programs and through experience with developing one's own programs.
- An awareness of when and how computers may be used in the academic disciplines and various fields of work, as well as in daily life.
- Some understanding of the problems and issues confronting individuals—and society generally—in the use of computers, including the social and economic effects of computers and the ethics involved in their use.

# IV. The Basic Academic Subjects

Study in the Basic Academic Subjects provides the detailed knowledge and skills necessary for effective work in college. Students who intend to go to college will need this basic learning in order to obtain the full benefits of higher education. This learning provides the foundation for college study in all fields.

For successful college work in certain fields, students will need more than this basic learning. This chapter also outlines the more extensive learning necessary for study in those fields.

The Basic Academic Subjects are English, the arts, mathematics, science, social studies, and foreign language. Although these subjects are presented separately, they depend on each other in many ways.

The Basic Academic Subjects are presented in two parts: the first explains *why* preparation in a subject is important for college entrants; the second outlines *what* college entrants need to know and be able to do in that subject area.

The knowledge and skills needed for college are *outcomes* of secondary school study. These outcomes can be achieved in a variety of ways. Consequently, although *Academic Preparation for College* is intended to provide a framework for designing secondary school curricula, this chapter itself does not describe such curricula. It does not give specific course titles and contents. It goes beyond prescribing years of study to describe what students actually need to learn as a result of their study. It outlines the knowledge and skills that students will need in order to have a fair chance of getting full value from their college education.

Acquiring the knowledge and skills provided by the Basic Academic Subjects involves careful selection of courses and sustained study before college. It is important, therefore, to indicate why students preparing for college need to make this effort and what they need to learn in the course of their high school work.

## English

### Why?

The arts and skills of English have been at the core of college preparation for generations, and so they are today in the midst of enormous technological and social change. The skills of reading, writing, listening, and speaking will be necessary as college students are called on to read a wide variety of materials; to write essays, reports, and term papers; to express themselves aloud; and to listen to and learn from discussions and lectures. English language skills serve as the foundation for all these activities.

The technology created in today's communications revolution will be used by people, and it is the education of these individuals that commands attention. Language—written and spoken, heard and read—is central to that education. Competence in language serves a variety of purposes: accomplishing the business of daily life, communicating attitudes and ideas, expanding thought, and informing the imagination.

Because language skills are interrelated, it is not possible to isolate them in practice, even though here they are outlined separately. Moreover, while this statement includes outcomes in reading, writing, and speaking and listening as part of the study of English, it is evident that such abilities are important to and should be developed in every subject. Although literature, language, and composition may be the special province of English, competence in writing, for example, pertains to all academic disciplines. Thus, skill in writing should be developed in other subjects as well as in English.

### What?

The learning outcomes in the next three groups either provide greater detail concerning the Basic Academic Competencies in reading, writing, and speaking and listening outlined in Chapter II, or they go beyond those competencies to specify additional learning outcomes. College entrants will need the following preparation in English.

**Reading and Literature**

- The ability to read critically by asking pertinent questions about what they have read, by recognizing assumptions and implications, and by evaluating ideas.
- The ability to read a literary text analytically, seeing relationships between form and content.
- The ability to read with understanding a range of literature, rich in quality and representative of different literary forms and various cultures.
- Interest in and a sense of inquiry about written works.
- The ability to respond actively and imaginatively to literature.

**Writing**

- The recognition that writing is a process involving a number of elements, including collecting information and formulating ideas, determining their relationships, drafting, arranging paragraphs in an appropriate order and building transitions between them, and revising what has been written.
- The ability to write as a way of discovering and clarifying ideas.
- The ability to write appropriately for different occasions, audiences, and purposes (persuading, explaining, describing, telling a story).
- Skill and assurance in using the conventions of standard written English.

**Speaking and Listening**

- The ability to engage in discussion as both speaker and listener—interpreting, analyzing, and summarizing.
- The ability to contribute to classroom discussions in a way that is readily understood by listeners—that is, succinct and to the point.
- The ability to present an opinion persuasively.
- The ability to recognize the intention of a speaker and to be aware of the techniques a speaker is using to affect an audience.
- The ability to recognize and take notes on important points in lectures and discussions.
- The ability to question inconsistency in logic and to separate fact from opinion.

**Language**

College entrants will also need to understand in some depth the following principles concerning the English language.

- English, like every other language, operates according to grammatical systems and patterns of usage.
- English continues to undergo change.
- English is influenced by other languages, both ancient and modern.
- English has several levels of usage, and consequently the language appropriate in some situations may not be appropriate in others.
- English has many dialects.
- English words, like those of other languages, gather meaning from their context and carry connotation.

## The Arts

### Why?

The arts—visual arts, theater, music, and dance—challenge and extend human experience. They provide means of expression that go beyond ordinary speaking and writing. They can express intimate thoughts and feelings. They are a unique record of diverse cultures and how these cultures have developed over time. They provide distinctive ways of understanding human beings and nature. The arts are creative modes by which all people can enrich their lives both by self-expression and response to the expressions of others.

Works of art often involve subtle meanings and complex systems of expression. Fully appreciating such works requires the careful reasoning and sustained study that lead to informed insight. Moreover, just as thorough understanding of science requires laboratory or field work, so fully understanding the arts involves first-hand work in them.

Preparation in the arts will be valuable to college entrants whatever their intended field of study. The actual practice of the arts can engage the imagination, foster flexible ways of thinking, develop disciplined effort, and build self-confidence. Appreciation of the arts is integral to the understanding of other cultures sought in the

study of history, foreign language, and social sciences. Preparation in the arts will also enable college students to engage in and profit from advanced study, performance, and studio work in the arts. For some, such college-level work will lead to careers in the arts. For many others, it will permanently enhance the quality of their lives, whether they continue artistic activity as an avocation or appreciation of the arts as observers and members of audiences.

## What?

Students going to college will profit from the following preparation in the arts.

- The ability to understand and appreciate the unique qualities of each of the arts.
- The ability to appreciate how people of various cultures have used the arts to express themselves.
- The ability to understand and appreciate different artistic styles and works from representative historical periods and cultures.
- Some knowledge of the social and intellectual influences affecting artistic form.
- The ability to use the skills, media, tools, and processes required to express themselves in one or more of the arts.

College entrants also will profit from more intensive preparation in at least one of the four areas of the arts: visual arts, theater, music, and dance.

* * * *

If the preparation of college entrants is in the *visual arts*, they will need the following knowledge and skills.

- The ability to identify and describe—using the appropriate vocabulary—various visual art forms from different historical periods.
- The ability to analyze the structure of a work of visual art.
- The ability to evaluate a work of visual art.
- To know how to express themselves in one or more of the visual art forms, such as drawing, painting, photography, weaving, ceramics, and sculpture.

* * * *

If the preparation of college entrants is in *theater*, they will need the following knowledge and skills.

- The ability to identify and describe—using the appropriate vocabulary—different kinds of plays from different historical periods.
- The ability to analyze the structure, plot, characterization, and language of a play, both as a literary document and as a theater production.
- The ability to evaluate a theater production.
- To know how to express themselves by acting in a play or by improvising, or by writing a play, or by directing or working behind the scenes of a theater production.

* * * *

If the preparation of college entrants is in *music*, they will need the following knowledge and skills.

- The ability to identify and describe—using the appropriate vocabulary—various musical forms from different historical periods.
- The ability to listen perceptively to music, distinguishing such elements as pitch, rhythm, timbre, and dynamics.
- The ability to read music.
- The ability to evaluate a musical work or performance.
- To know how to express themselves by playing an instrument, singing in a group or individually, or composing music.

* * * *

If the preparation of college entrants is in *dance*, they will need the following knowledge and skills.

- The ability to identify and describe—using the appropriate vocabulary—dances of various cultures and historical periods.
- The ability to analyze various techniques, styles, and choreographic forms.
- The ability to evaluate a dance performance.
- To know how to express themselves through dancing or choreography.

## Mathematics

### Why?

All people need some knowledge of mathematics to function well in today's society. Mathematics is an indispensable language of science and technology, as well as business and finance. All people, therefore, need some fluency in this language if they are to contribute to and fare well in our contemporary world.

More than at any time in the past the knowledge and appreciation of mathematics is essential to students' intellectual development. The advances of recent years in computer science and other highly technical fields such as space science have opened new horizons to those trained in mathematics. Young people who avail themselves of the opportunity to gain strong preparation in mathematics and in the sciences not only will grow intellectually but also keep open the door to a wide range of career choices.

Students going to college need mathematical skills beyond the elementary ones. They need a knowledge of computing to deal with the new age of computers and information systems. They need a knowledge of algebra, geometry, and functions to major in a wide range of fields, from archaeology to zoology. They need a knowledge of statistics for such fields as business, psychology, and economics.

More extensive knowledge and skills, including preparation for calculus, will be needed by college entrants who expect to take advanced mathematics courses or to major in such fields as engineering, economics, premedicine, computer science, or the natural sciences.

### What?

The following learning outcomes in some cases provide greater detail concerning the Basic Academic Competency in mathematics outlined in Chapter II and the computer competency described in Chapter III, but in other cases go beyond the competencies to specify further outcomes of the study of mathematics. College entrants will need the following basic mathematical proficiency.

- The ability to apply mathematical techniques in the solution of real-life problems and to recognize when to apply those techniques.
- Familiarity with the language, notation, and deductive nature of mathematics and the ability to express quantitative ideas with precision.
- The ability to use computers and calculators.
- Familiarity with the basic concepts of statistics and statistical reasoning.
- Knowledge in considerable depth and detail of algebra, geometry, and functions.

More specifically, college entrants will need the following preparation in mathematics.

**Computing**

- Familiarity with computer programming and the use of prepared computer programs in mathematics.
- The ability to use mental computation and estimation to evaluate calculator and computer results.
- Familiarity with the methods used to solve mathematical problems when calculators or computers are the tools.

**Statistics**

- The ability to gather and interpret data and to represent them graphically.
- The ability to apply techniques for summarizing data using such statistical concepts as average, median, and mode.
- Familiarity with techniques of statistical reasoning and common misuses of statistics.

**Algebra**

- Skill in solving equations and inequalities.
- Skill in operations with real numbers.
- Skill in simplifying algebraic expressions, including simple rational and radical expressions.
- Familiarity with permutations, combinations, simple counting problems, and the binomial theorem.

**Geometry**

- Knowledge of two- and three-dimensional figures and their properties.
- The ability to think of two- and three-dimensional figures in terms of symmetry, congruence, and similarity.
- The ability to use the Pythagorean theorem and special right triangle relationships.
- The ability to draw geometrical figures and use geometrical modes of thinking in the solving of problems.

**Functions**

- Knowledge of relations, functions, and inverses.
- The ability to graph linear and quadratic functions and use them in the interpretation and solution of problems.

*College entrants expecting to major in science or engineering or to take advanced courses in mathematics or computer science will need the following more extensive mathematical proficiency.*

***Computing***

- *The ability to write computer programs to solve a variety of mathematical problems.*
- *Familiarity with the methodology of developing computer programs and with the considerations of design, structure, and style that are an important part of this methodology.*

***Statistics***

- *Understanding of simulation techniques used to model experimental situations.*
- *Knowledge of elementary concepts of probability needed in the study and understanding of statistics.*

***Algebra***

- *Skill in solving trigonometric, exponential, and logarithmic equations.*
- *Skill in operations with complex numbers.*
- *Familiarity with arithmetic and geometric series and with proofs by mathematical induction.*
- *Familiarity with simple matrix operations and their relation to systems of linear equations.*

***Geometry***

- *Appreciation of the role of proofs and axiomatic structure in mathematics and the ability to write proofs.*
- *Knowledge of analytic geometry in the plane.*
- *Knowledge of the conic sections.*
- *Familiarity with vectors and with the use of polar coordinates.*

***Functions***

- *Knowledge of various types of functions including polynomial, exponential, logarithmic, and circular functions.*
- *The ability to graph such functions and to use them in the solution of problems.*

## Science

### Why?

Science—the study of the natural world—is both useful and rewarding in its own right. It provides a sense of the order in the universe and is one of civilization's major intellectual achievements. It is fueled by the same creativity required for art, music, or literature. It relies on curiosity, objectivity, and healthy skepticism. The study of science, then, is excellent preparation for college regardless of students' intended field of concentration.

Technology, which grows out of scientific discovery, has changed and will continue to change the world in which we live. Our society relies more and more on complex technology. Today's industry, agriculture, business, and professions require people trained in science and technology.

Scientific and technological developments have resulted in complex social issues that must be intelligently addressed. Such developments include: nuclear power, genetic engineering, fertilizers and pesticides, robotics, information and data processing, and organ transplantation. An evaluation of the benefits and risks inherent in these developments requires a knowledge and understanding of science and its methods.

College-bound students will need sufficient scientific knowledge to be aware of themselves as biological organisms in a physical world, to take advantage of career options requiring study of science, and to function effectively as responsible citizens in a society

increasingly shaped by science and technology. They will need not only to know about science but also to understand the fundamentals of how to carry out scientific work.

## What?

College entrants will need the following preparation in science.

**Laboratory and Field Work**

- The ability to distinguish between scientific evidence and personal opinion by inquiry and questioning.
- The ability to recognize the role of observation and experimentation in the development of scientific theories.
- Sufficient familiarity with laboratory and field work to ask appropriate scientific questions and to recognize what is involved in experimental approaches to the solutions of such questions.
- The skills to gather scientific information through laboratory, field, and library work.
- The ability to organize and communicate the results obtained by observation and experimentation.

**Mathematical Skills**

- A quantitative understanding of at least one field of science—an understanding that employs the basic mathematical proficiency for all college entrants outlined in the foregoing description of learning outcomes in mathematics.
- The ability to interpret data presented in tabular and graphic form.
- The ability to draw conclusions or make inferences from data.
- The ability to select and apply mathematical relationships to scientific problems.
- The ability to use mathematical relationships to describe results obtained by observation and experimentation.
- The ability to interpret, in nonmathematical language, relationships presented in mathematical form.

**Fundamental Concepts**

- Understanding in some depth of the unifying concepts of the life and physical sciences such as cell theory, geological evolution,

organic evolution, atomic structure, chemical bonding, and transformations of energy.

**Detailed Knowledge**

College entrants will need detailed knowledge of at least one field of science, ordinarily the field in which they have a quantitative understanding. This detailed knowledge could be in the earth sciences or in one of the newer, interdisciplinary fields of science. It could also be in one of the more traditional fields: biology, chemistry, or physics.

* * * *

In *biology* such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: molecular and cellular aspects of living things, structure and function in plants and animals, genetics, evolution, plant and animal diversity and principles of classification, ecological relationships, and animal behavior.

* * * *

In *chemistry* such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: states of matter, structure of matter, solutions, reactions of matter (including acid-base and oxidation-reduction), stoichiometry, energy changes in chemical reactions, equilibrium, kinetics, and descriptive chemistry (including periodic classification, metals, nonmetals, and introductory organic chemistry).

* * * *

In *physics* such detailed knowledge includes the central concepts, principles, and basic factual material of most, if not all, of the following topics: mechanics, optics, wave phenomena, electricity and magnetism, heat and kinetic theory, atomic and nuclear physics, and relativity.

*College entrants expecting to major in scientific fields will need the more extensive mathematical proficiency for such students outlined in the mathematics section. Additional quantitatively based scientific study will also be important.*

## Social Studies

### Why?

The social studies focus on the complexity of our social environment. The subject combines the study of history and the social sciences and promotes skills in citizenship.

We live in a distinct kind of society and all people need to understand how such modern societies function and how they have developed. They need information concerning past civilizations and their links to present ones.

If people are to perform effectively as citizens in a democratic society, they need knowledge about central institutions and values in their own society and in other major societies around the world. They need to understand the international context of contemporary life. Defining problems and employing various kinds of information in seeking solutions to those problems require the analytical skills developed in the study of history and the social sciences.

Preparation in social studies will be important to college entrants in other ways. It will help them understand major and exciting discoveries about human beings and their social environment as well as the practical results of these discoveries. It will help them understand the context for the arts and sciences. It will help them prepare for advanced work in history and the social sciences, including anthropology, economics, geography, political science, psychology, and sociology.

### What?

All college entrants will need the following general understanding of the social studies.

- Basic factual knowledge of major political and economic institutions and their historical development.
- Basic factual knowledge of the social and cultural fields of history.
- An introductory knowledge of the content and concepts of the social sciences.
- A grasp of major trends in the contemporary world (for example, nationalism or urbanization).

- Familiarity with a variety of written, numerical, and visual forms of data.
- Familiarity with the techniques of quantitative and nonquantitative analysis.
- Familiarity with diverse interpretations of data.

**History**

College entrants will need certain general knowledge and skills in political, social, and cultural history.

- Some understanding of the relationship between present and past, including contrasts between contemporary institutions and values and those of the past, the reasons for these contrasts, and leading continuities between past and present.
- Some understanding of how to approach the problem of change over time.
- The ability to recognize historical cause and effect.
- The ability to identify major historical turning points.
- Some ability to develop historical interpretations.

More specifically, college entrants will need the following basic knowledge.

*World History, Geography, and Cultures*

- The basic features of major societies and cultures in the contemporary world: their geography, major economic and social structures, political systems, and religions.
- The historical developments underlying present connections and similarities among the world's peoples, and the major differences dividing them.
- The chronology and significance of major events and movements in world history (for example the Renaissance, the Industrial Revolution, and the spread of Islam).
- The international context of contemporary diplomacy and economics.

*United States History*

- The relationship between events and historical trends in the

United States and trends elsewhere in the world, developed through analysis of major similarities and differences.
- The interaction among peoples of different national origins, races, and cultures and how such interaction has shaped American history.
- The chronology and impact of political events, development of governmental and other social institutions, technological and environmental changes, and changes in social and cultural values.

**Social Science**

College entrants will need the following basic knowledge and skills in the social sciences.

- The ability to understand basic information developed by the social sciences, including statistical data and other materials.
- Familiarity with the basic method of the social sciences, that is, with the framing and empirical testing of hypotheses.
- A basic understanding of at least one of the social sciences and of how its practitioners define and solve problems.
- Familiarity with how to explore a social problem or social institution by means of ideas drawn from several social sciences.

## Foreign Language

### Why?

Knowledge of another language fosters greater awareness of cultural diversity among the peoples of the world. Individuals who have foreign language skills can appreciate more readily other peoples' values and ways of life. Knowledge of a foreign language serves two other important purposes: it permits informal communication and it facilitates the exchange of ideas and information in such areas as commerce, diplomacy, science, technology, law, and the arts.

By learning another language people gain greater insight into the workings of their native language. They also can come to realize that the patterns of their native language are only one way of viewing the

world. They learn how to interpret experience in other ways and to understand the close connection between language and thought.

We live in a multicultural nation. Many people speak a home language other than English. Some of these people seek to improve their proficiency in that other language and to preserve their cultural heritage. In doing so they preserve and develop a valuable national resource.

The classical languages and their literatures show the pervasive influence of Greek and Roman cultures on social and political institutions throughout Western history. Many of the words of English, Spanish, and the other major Western languages are derived from Latin. Besides such derivatives, actual words and phrases from the classical languages are present in English, particularly in law and medicine.

College entrants need a background in another language to engage in advanced study in such fields as languages, literature, and history. Knowledge of a foreign language helps students prepare for careers in commerce, international relations, law, science, and the arts.

## What?

College entrants will need proficiency in another language and culture that provides the following skills.

- The ability to ask and answer questions and maintain a simple conversation in areas of immediate need and on very familiar topics.
- The ability to pronounce the language well enough to be intelligible to native speakers.
- The ability to understand, with some repetition, simple questions and statements.
- The ability to read and understand the information presented in a simple paragraph.
- The ability to write a short paragraph on a familiar topic.
- The ability to deal with some everyday situations in the culture such as greetings, leave-takings, buying food, and asking directions.

Students with this basic proficiency will also need some knowledge of the culture, history, and life patterns of the society or societies in which the language is spoken.

*College entrants who expect to follow an advanced program of study in another language or in other subjects requiring language skills will need a greater proficiency that provides the following skills.*

- *The ability to engage in conversation about such subjects as school activities, personal interests, and autobiographical information.*
- *The ability to understand the essential points of a lecture, narrative, or explanation delivered at moderate speed.*
- *The ability to read and comprehend some literature and most factual information in nontechnical prose such as newspaper articles addressed to the general reader.*
- *The ability to write several paragraphs of reasonably coherent and correct prose to produce summaries, descriptions of events, or social correspondence.*
- *The ability to handle routine social situations in a culturally correct manner showing understanding of common rules of how individuals behave toward one another.*

*Students with this greater proficiency also will need some knowledge of the history, geography, institutions, current political situation, and the intellectual and artistic achievements of the society or societies in which the language is spoken.*

* * * *

Learning outcomes in a classical language take a different form, since Latin and ancient Greek are generally taught not as spoken languages but as literary languages. Thus, the two principal outcomes are reading comprehension and some knowledge of Roman or Greek culture. The proficiency expected of college entrants whose language preparation is in Latin or Greek is reflected in the following skills.

- The ability to understand reading materials of low difficulty, that is, adapted or simplified texts.
- The ability to give a reasonably accurate account of the contents of the reading material by answering questions, paraphrasing, or summarizing.

*Students intending to undertake advanced study in a classical language will need, in addition, the following skills.*

- *The ability to understand authentic unsimplified prose or poetry without undue reliance on a dictionary.*
- *The ability to translate prose or poetry into reasonably accurate English.*

# V. Achieving the Outcomes

Identifying the academic preparation needed for college is a first step toward providing that preparation for all students who might aspire to higher education. But the real work of actually achieving these learning outcomes lies ahead. It will require a vast extension of the commitment and cooperative action that led to this description of academic preparation for college.

## Action within the Schools

The commitment, sustained effort, and creativity of local schools will be crucial to improving the preparation of college-bound students. Teachers and administrators will have to consider carefully and work out curricular and instructional approaches to achieving these learning outcomes. One important question will be how to relate learning in the Basic Academic Subjects to development of the Basic Academic Competencies. To foster writing skills in every subject is one step in this direction. Much more will need to be done, however, to foster reasoning, reading, and all the other competencies. Individual teachers will need to be aware of the connections between their particular subject and the Basic Academic Competencies. Difficulties in learning mathematics or science, for example, are very often caused by difficulties in reading. Teaching in any subject that is conducted in ignorance of, or in disregard for, the Basic Academic Competencies is simply inadequate.

Some of these learning outcomes are new. Making them available may require rethinking and reorganizing secondary school curricula. Others of these outcomes have been neglected. To achieve them more successfully it may be necessary to improve the coordination and content of existing courses. Improving preparation for college will also involve strengthening elementary and junior high school curricula. Coordination and cooperation of the sort that led to

this statement will be valuable, as high schools work with their partners in elementary and junior high schools.

As high schools devise curricular and instructional approaches to achieving these learning outcomes, they may find it useful to take into account several suggestions made by the high school and college teachers who fashioned the description of these outcomes. Mathematics teachers pointed out, for example, that making place for newly important topics may involve shifting the traditional emphasis in the mathematics curriculum. Social studies teachers underlined that the learning outcomes in that subject are achieved most readily through a carefully designed sequence of courses that builds progressively on student skills, concepts, and factual knowledge. While foreign language teachers emphasized that language proficiency is achieved best by intensive and sustained study that begins as early as possible, mathematics teachers emphasized that the most effective preparation would include study of mathematics in the final year of high school. Such suggestions are, of course, only a beginning. Schools will need to devise their own coherent curricular and instructional strategies.

Not only teachers and administrators but also high school counselors will have an important role to play in achieving these outcomes. They can explain the connection of these outcomes—and the effort needed to achieve them—to success in college study. Counselors can help build a climate of encouragement and expectation that will motivate students to persist in a strong program of academic preparation for college.

The overall environment created in the schools is an important part of achieving these outcomes. Students learn best when excellence is expected of them and when they are encouraged to achieve it. They need incentives and stimulation to learning. Students will achieve these learning outcomes most readily when instruction is keyed to the stages of their intellectual development. Students will also need early planning of their academic programs with the help of parents, counselors, and teachers. They will need persistent follow-through as well.

Students will need to bear in mind the effect of their own attitude on the learning process and on their school. They will need a sense of personal responsibility for their own progress and a desire to

make full use of their teachers as resources. They must be willing to conduct themselves in ways that make learning possible for their classmates as well as for themselves.

## Action by Others Concerned with the Schools

Achieving these outcomes will require work by many others in addition to students, teachers, counselors, and school administrators. Boards of education and other officials responsible for educational policy will have to be aware of the preparation needed for college as they consider curricula, standards, and overall policy for the schools. They may have to reassess priorities and reallocate resources. Many secondary schools need additional financial support. Many need to add teachers in certain subjects. Well-trained teachers will be crucial to achieving the learning outcomes in all subjects.

Solving these problems will require the commitment of local communities and of the public at large. It will be important to remember that our future well-being is bound up with the education of *all* children. The quality of education should be of concern to all, whether or not they have children in school.

Concern for educational quality should be expressed in ways that advance social justice. Educational quality must not lead to actions that limit the aspirations and opportunities of disadvantaged and minority youth, or that would reverse the progress that has already been made. Rather, concern for educational quality must be expressed in a commitment to quality for all students. Arbitrary standards must not be imposed without concern for enabling students to meet them. Expectations such as these learning outcomes should be used as criteria for designing educational efforts that will enable more students to succeed.

Colleges will have a special role to play. They must recognize that many incoming students will not have had the chance to prepare adequately for higher education and that colleges will still have an obligation to meet the needs of such students. A decision to admit a student is, after all, an agreement to provide instruction at that student's current level of knowledge and skill. Colleges have special

resources, particularly the knowledge and expertise of their faculties, that can help high schools strengthen the preparation of students for higher education. High schools may also find it useful to draw on the experience of successful college programs for serving inadequately prepared students. Such resources will be useful if they can be made available in a spirit of collegiality and cooperation.

Working through the Educational EQuality Project, the College Board will continue its efforts to help improve the academic preparation of all potential college entrants. *Academic Preparation for College* will be made available as widely as possible. The EQuality project will work to build acceptance of these learning outcomes as a basis for curricular planning by the high schools. It will help to build a network for the exchange of ideas and mutual support among high schools working to achieve these outcomes.

The project will mobilize other assistance for high schools by fostering collaborative efforts with colleges and by calling on the nationwide accumulation of good judgment and commitment that has led to the identification of these outcomes. It will also encourage colleges to employ this description of learning in clearly and convincingly stated recommendations for the preparation of incoming students.

Improving preparation for college can help improve the quality of high school education overall, whether or not students intend to enter college. Consequently, the Educational EQuality Project will be working to build alliances not only within education but also between education and others—particularly employers—who are concerned with how well high school students are educated.

Significant educational improvement is a challenging undertaking, one beyond the resources of any single organization. But *Academic Preparation for College* shows that it is possible to cooperate in identifying the knowledge and skills students need in order to have the best chance in higher education. Now we must face up to providing that chance for all students.

# Appendixes

## Appendix A. Observing: A Competency to Consider

Late in the course of deliberations surrounding the first year of the EQuality project, a seventh area was suggested as a Basic Academic Competency along with reading, writing, speaking and listening, mathematics, reasoning, and studying. Variously called "observing," "productive observing," "perceiving," and "viewing," it needed to be further developed and refined before being considered a competency comparable to the other six.

The College Board's first step was to involve school and college teachers from all academic fields to identify the abilities related to "observing" that college entrants need to have. Then the resulting list of abilities was submitted to a broad audience for comment. There was widespread agreement that the identified abilities are crucial to the learning process. But there was no clear consensus on whether or not "observing" should appear as a Basic Academic Competency.

The mix of opinion suggests that it would not be appropriate to add "observing" as a Basic Academic Competency to the EQuality project statement. By the same token, a more or less even division of opinion on the subject, as well as the strength of the feelings and the nature of the concerns expressed on both sides in the debate, suggests that the matter should not simply be dropped and that wider consideration would be beneficial.

Previous discussions have suggested the following description of "observing" as a basic academic competency needed by college entrants. It is presented in the spirit of expanding those discussions.

### Observing

- The ability to see and to interpret things and events in nature, in the social environment, in the laboratory, and in art with reasonable accuracy, and to record such observations in appropriate form.

- The ability to use different levels of observing (e.g., general overview, detailed observation, intense inspection), to recognize the distinctive features of observed phenomena, and to relate such observations to broader patterns and generalities.
- The ability to recognize, interpret and use appropriately for various purposes different forms of visual materials (e.g., cartoon, diagram, graph, illustration, model, painting, or symbol).

## Appendix B. Members of the Council on Academic Affairs, 1980-83

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Maria M. Tatar, Professor of German, Harvard University, Cambridge, Massachusetts
Howard T. Young, Professor of Romance Languages, Pomona College, Claremont, California

## Appendix E. Members of the Ad Hoc Panel on Computer Competency, 1983

Floyd L. Downs, Mathematics Teacher, Hillsdale High School, San Mateo, California

Donald L. Kreider, Professor of Mathematics, Department of Mathematics, Dartmouth College, Hanover, New Hampshire

Marlaine Lockheed, Senior Research Scientist, Educational Testing Service, Princeton, New Jersey

Moises Perez-Martinez, Assistant to the Director of Education, National Urban League, Inc., New York, New York

Matthew Quinn, Graduate Dean, Iona College, New Rochelle, New York

Paul Shapiro, Coordinator of High School Computer Programs, Newton Public Schools, Massachusetts

Dorothy S. Strong, Director of Mathematics, Chicago Public Schools, Illinois

## Appendix F. List of Dialogues

### Urban Dialogues on the Basic Academic Competencies

| *Location* | *Host* |
|---|---|
| West Hartford, Connecticut | University of Hartford |
| Atlanta, Georgia | Georgia State University |
| Los Angeles, California | California State University |
| Chicago, Illinois | Chicago Board of Education |
| Washington, D.C. | The University of the District of Columbia, Van Ness Campus |
| St. Paul, Minnesota | University of Minnesota |
| Nashville, Tennessee | Fisk University |

### Dialogues on the Basic Academic Subjects

| *Location* | *Host* |
|---|---|
| **English** | |
| Hartford, Connecticut | Trinity College |
| Princeton, New Jersey | Princeton University |
| Oklahoma City, Oklahoma | University of Oklahoma |
| Charlottesville, Virginia | University of Virginia |
| **The Arts** | |
| Providence, Rhode Island | Rhode Island School of Design |
| Atlanta, Georgia | Spelman College |
| Durham, North Carolina | Duke University |
| **Mathematics** | |
| Miami, Florida | Miami-Dade Community College |
| Austin, Texas | University of Texas |
| Denver, Colorado | University of Denver |
| Washington, D.C. | Howard University |
| **Science** | |
| Schenectady, New York | Union College |
| Columbus, Ohio | Ohio State University |
| Ann Arbor, Michigan | University of Michigan |

| *Location* | *Host* |
|---|---|
| **Social Studies** | |
| Pittsburgh, Pennsylvania | Pittsburgh Theological Seminary |
| Grinnell, Iowa | Grinnell College |
| Boston, Massachusetts | Boston University |
| **Foreign Language** | |
| Phoenix, Arizona | Maricopa County Community College |
| Portland, Oregon | Reed College |
| Berkeley, California | University of California |
| New York, New York | New York University |
| **All Subjects** | |
| Princeton, New Jersey | National Committee for Citizens in Education |
| San Antonio, Texas | Trinity University |
| Chicago, Illinois | Chicago Board of Education |